THE OHIO STATE UNIVERSITY
JOHN GLENN SCHOOL OF PUBLIC AFFAIRS
Working Paper Series

Counterfactual Impact Evaluation of Enterprise Support Policies: An Empirical Application to EU Co-Sponsored, National and Regional Programs

July 2010

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Abstract

While the importance of enterprise support policies in the EU continues to grow, there remains only limited empirical evidence examining the effects of the policies on socially relevant outcomes such as employment. This paper shows how to exploit firm-level data, formed by merging longitudinal employment and firm demographic information with the firm-level archives of the incentive payments, to offer robust counterfactual impact evaluation evidence on the employment effects of the coexisting European Regional Development Fund (ERDF) co-sponsored, national and regional programs commonly operated in many EU regions. The analysis uses data from a large northern Italian region and yields employment impacts of the policies under plausible identification assumptions, disentangling the impacts of different values of both the economic intensities of the program assistance and different forms of assistance (the latter distinguishing between capital grants and below-market interest rate/revolving loans). The paper finds that the absolute per-firm employment effects of the programs are increasingly larger the higher the economic value of the incentives awarded to the assisted firms. The incentives with the highest per-firm economic value, however, yield employment impacts with a much higher cost per each additional new job than incentives with a lower economic value. The results of the analysis also show that the absolute per-firm employment effects of soft loans are similar to those of capital grants. However, taking into consideration that soft loans bear a much lower cost in terms of public money devoted to the subsidies than capital grants, the impact estimates retrieved from analysis indicates that soft loans possess an higher employment effectiveness than capital grants.

JEL classification: O1; R5; C23

Keywords: Enterprise support programs, Counterfactual Impact Evaluation, Investment Grants, Below market-rate Loans.

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1. Introduction

While the European Union spends billions of euros on enterprise support policies aimed at fostering regional economic development and social cohesion (13.6 billions of euros for the 2007-2013 programming period, Barca 2009), the empirical evidence on the effectiveness of such policies based on rigorous counterfactual impact evaluation studies is still very limited. As also argued elsewhere (e.g. Bartik 2004 and Bartik and Bingham 1997), empirical counterfactual impact evaluations attempting to estimate how much of the different outcomes between treatment and control groups are attributable to the program/s are a crucial tool for evaluating enterprise support policies. Sound counterfactual impact evaluations on the proximate employment or local economic growth outcomes of the policies provide vital empirical evidence that are also a necessary base for possible subsequent survey and focus group analyses and/or regional econometric models aimed at estimating (when the importance of the program is appropriate) more distant fiscal and employment benefits in terms of long-run or province/regional/state- economy effects.

Retrieving sound counterfactual impact estimates for enterprise support policies is not an easy task, as the analysis has to disentangle the program effects from the many confounding factors that do affect firms and economic growth outcomes independently from the programs being evaluated and because of the simultaneous presence of a significant number of many competing enterprise support programs (ERDF -European Regional Development Fund- co-sponsored, national and regional programs) often available in a same area.

To date, the available rigorous counterfactual impact evaluations of enterprise support policies in EU countries were able to analyze only single-policy implementations (e.g. Bondonio and Greenbaum 2006; Bronzini and Di Blasio 2006, Adorno et al. 2007), The impact of capital subsidies: new estimations under continuos treatment, Giornale degli Economisti ed Annali di Economia, 66(1), 67-92.). This is primarily due to the lack of comprehensive data on the whole array of ERDF co-sponsored incentive payments and the entire set of national and regional enterprise support programs available in a particular geographic area. There are two main limitations to analyss lacking comprehensive program activity data. First, it is not possible to undertake comparative evaluations to assess which types of policy designs are more effective (in terms of the different forms of assistance and characteristics of the firms targeted by the program incentives). Second, no information is available on the whether the comparison-group firms not assisted by the ERDF program examined in the analysis received some assistance from other national or regional public programs. As a result, in order to correctly identify counterfactual impact estimates, single-program evaluations have to rely on the crucial hypothesis that the probability of firms gaining access to additional unobserved regional or national programs incentives is the same across both the assisted firms and the comparison group firms that did not receive assistance from the single observed program being evaluated.[1]

[1] In Bondonio and Greenbaum (2006) data were geographically aggregated at the province level, with units of observation operationalized as province-sector cross tabulations. At such aggregate level, treated units of observation (i.e. Obj.2 areas) and non-treated units of observations (i.e. non objective 2 areas) were eligible for the same assistance provided by the platform of national and regional incentives available without any specific

With the availability of comprehensive firm-level databases encompassing the entire set of ERDF co-sponsored national and regional programs, counterfactual impact evaluation studies can exploit the programs' heterogeneity to provide empirical evidence of great interest to policy makers. Further, such evaluations can be made more useful for policy purposes by measuring program impacts based on variation in the monetary values of the incentives, variation in the forms of assistance (e.g. capital grants versus repayable soft-loans), and variation in the types of firms targeted for assistance.[2]

This paper offers an empirical model that yields robust and useful counterfactual impact estimates from the availability of such comprehensive firm-level databases, underlying the importance that these types of databases are maintained by regional and national public authorities throughout the EU. The empirical model developed in the analysis exploits the heterogeneity of a large number of co-existing national, regional and ERDF co-sponsored programs to yield impact estimates of the policies that disentangle the impacts of different values of both the economic intensities of the program assistance and different forms of assistance, distinguishing between capital grants and below-market interest rate/revolving loans.

The impact estimates produced in the paper capture the employment effects of a group of 8 national programs, 6 former national programs devolved to the regional government, 4 regional programs and 7 Obj.2 area programs co-funded by the ERDF operating in a large northwestern Italian region (Piemonte) in the 2001-2003 period. The employment outcomes considered in the analysis are aimed at capturing the proximate effects of the support policies, disentangling the part of the firm-level outcome variation that was indeed due to the programs effects from the part due to socio-economic factors independent from the programs interventions. The focus on estimating proximate effects of the support policies is due to the fact that the economic importance of the group of assisted firms, compared to the size of the entire regional/national economies in which they are located is still limited (as it is very often the case with every enterprise support policy). As a result, even if, in principle, enterprise support programs of all sorts are somehow capable of affecting distant outcomes, such as macro-economic or long-run indicators of the well-being of residents measured at the level of the entire regions in which eligible firms are located, any actual program impact (in the form of a positive shock given to the regional economy) becomes virtually undetectable from the changes to the outcome variable of the evaluation caused by many confounding factors of a much greater importance than the possible programs-induced improvements in the economic activity of the assisted firms.

The program impact estimates produced in the analysis focus on medium-terms effects (with a time span of a maximum of 3 years after the program support). This is because using rigorous comparison-group statistical impact evaluation designs to assess whether or not business incentives had long-lasting impacts on employment or other economic activity

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geographical targeting. At such aggregate level, therefore, the hypothesis that treated and non-treated units were assisted in comparable ways by the programs not included in the analysis is more plausible.

[2] In the United States, in the case of the Enterprise Zone programs, such comparative evaluation studies provided valuable empirical evidence on the different specific policy features (among the heterogeneous State-specific policy designs) that were more effective in boosting employment and other proximate business activity indicators (e.g. Bondonio and Greenbaum 2007, Peters and Fisher 2002, Greenbaum and Engberg 2004, Engberg and Greenbaum 1999).

outcomes of the assisted firms is often to be avoided when the evaluation is carried with firm-level data. Assisted firms are economic units embedded in many ways in a network of economic transactions from one to the others. In the long-run a possible positive program shock produced on the employment of each single assisted firm is likely to have enough time to generate subsequent impacts also on non-assisted firms. Those outcome data become endogenous to the treatment and cannot anymore be considered unaffected by the program incentives and used to retrieve counterfactual estimates.[3]

The empirical evidence produced by the analysis indicates that the absolute per-firm employment effects of the programs are increasingly larger the higher the economic value of the incentives awarded to the assisted firms. The incentives with the highest per-firm economic value, however, yield employment impacts with a much higher cost per each additional new job than incentives with a lower economic value. The results of the analysis also show that the absolute per-firm employment effects of soft loans are similar to those of capital grants. However, taking into consideration that soft loans bear a much lower cost in terms of public money devoted to the subsidies than capital grants, the impact estimates retrieved from analysis indicates that soft loans possess a much higher employment effectiveness than capital grants.

The remainder of the paper is organized as follows. Section 2 describes the features of the enterprise support policies considered in the analysis and illustrates the methodology behind the "net equivalent subsidy" figures used to compute the monetary values of the incentives. Section 3 describes the data used in the analysis, the programs activities and the employment descriptive statistics. Section 4 describes the econometric model used to retrieve the counterfactual impact evaluation estimates. Section 5 illustrates and discusses the results of the analysis. Section 6 offers some concluding remarks.

2. Enterprise Support Policies and Computation of the Gross Grant Equivalent

The enterprise support policies considered in the analysis are summarized in Tables 1-4. These policies represent the entire set of public assistance available to industrial firms in the Northern-Italian region of Piemonte from National and Regional (including former national incentives devolved to the regional government) and ERDF-co-sponsored subsidies[4] during the 2001-2003 period.

[3] Estimating the impact of enterprise support policies in terms of long-run macro-economic or employment benefits for an overall province/regional/state economy, could be attempted using regional macroeconomic simulation (e.g. REMI – Fan et al. 2000; HERMIN – Bradley and Herce 1995 Bradley et al. 2003, QUEST – Roeger 1996, Ratto et al. 2008). This is a viable evaluation option when the importance of the economic outputs of the assisted firms is not disproportionably smaller than the size of the local economy and the background elasticity parameters of the simulation model can be adequately tested and supported by convincing evidence. Even in such cases, analyses with regional macroeconomic simulation models, however, should be performed only after having previously estimated (with a rigorous counterfactual approach based on micro-data) the program impact on proximate firm-level outcomes. This is because the set of multipliers used by regional macroeconomic models should not be applied directly to the measures of program activity (such as the entire volume of jobs or investments generated by the assisted firms), but instead only to the number of additional jobs or new investments that the assisted firms would have not generated being absent the program incentives.

[4] Excluded from the analysis are solely a small number of programs for which data on the incentive payments were not transmitted by the public authorities in charge of managing the subsidies.

[Tables 1-4]

2.1 Computation of the Gross Grant Equivalent

In order to comparatively estimate the impacts of the different support programs, all data on the economic value of the incentives granted to the assisted firms are transformed into gross grant equivalent (GGE) values. The GGE values used in the analysis are computed as the net present values of the gross grant equivalent subsidy paid to the assisted firms (considered in terms of absolute value of the equivalent grant rather than as the ratio between the equivalent grant and the value of the assisted investment).

In practical terms, data on the payments concerning capital grants subsidies (applicable to either capital- or interest-rate- expenditures), in most cases, were close to be readily interpretable as GGE. Data on soft loans (below-market-rate-loans) financing, instead, in order to be computed as GGE, needed to be transformed into the net present value of the difference between the flow of interest payments made by the assisted firms at the below-market-rate provisioned by the program and the flow of interest payments that the assisted firms would have made at market rates.[5]

3. Data on Programs Activities, Share of Assisted Firms, and Employment Descriptive Statistics

The data used in the analysis is the result of integrating business data from the Italian National Statistical Institute (ISTAT) with governmental programmatic data.

Business data covering the years 2000-2003 come from ISTAT-ASIA (i.e. the statistical archive of active firms maintained by the ISTAT[6]), which provides an extract of the statistical archives of active firms. The data contain employment and demographic information for all of the active firms located in the Piemonte region and operating in the following industrial sectors: mineral extractions (code C of the ISTAT Ateco-2002[7] classification); manufacturing activities (code D, ISTAT Ateco-2002); production and distribution of electricity, natural gas, steam and hot water (code E, ISTAT Ateco-2002). We also draw data from the ISTAT 2001 Italian Census of Industry and Services (for the part concerning the establishment-level data on local units located in the Piemonte region).

Policy data come from various Italian public authorities, including the Ministry of Production Activities, Mediocredito Centrale, Regione Piemonte, Finpiemonte, and Sviluppo Italia. The data on program activity for each of the enterprise support policies contain information on the dates and amounts of each subsidy payment. Further, each of the program activity databases has the data organized by a unique identifier for the recipient firms, the

[5] Formally, the GGE values computed for the data on soft loans benefits are retrieved following the specifications indicated in the Annex I of the Guidelines on National Regional Aid, Official Journal of the European Communities 98/C 74/19, 1998.

[6] ISTAT-ASIA is formed by admninistrative data on firms demograpohic, employment and sales information provided by a number of Italian national agencies.

[7] Ateco-2002 is the latest standard industrial classification produced by ISTAT.

V.A.T identification number. Such unique identifier allows the programmatic data to be merged with ISTAT business data. The final database includes the following firm-level information: geographic location of the firm legal residence; standard industrial sector (5 digits Atceo-2002); legal form of enterprise; yearly average stock of total employment (years 2000-2003); yearly monetary values (in terms of gross grant equivalent) of the subsidies received, sorted by name and type of the programs; number of firm's local units; whether or not the firm is a craft enterprise.

3.1. The Distribution of the Incentives by Type of Enterprise Support Programs and Characteristics of the Assisted Firms

Table 5 illustrates the number of assisted projects funded by each of the twenty-five enterprise support programs considered in the analysis and the corresponding total gross equivalent grant (GGE) value of the incentives paid to the subsidized firms. The individual program registering the highest total GGE value of incentives awarded to firms in the Piemonte Region in the 2001-2003 period is Law 488/92, with 65.4 million €, equal to 16.5% of the total[8]. The program of Law 266/97, article 14, providing support to enterprises in distressed urban areas, follows with about 49.1 million € of GGE value of subsidies (equal to 12.4% of the total). The subsidies of Law 140/97 (R&D aid with automatic eligibility rules) are in third place with 48.8 million € of GGE (12.3% of the total).[9]

[Table 5]

The distribution of the incentives by firm-size (measured by total number of workers), can be described as follows: firms with 10 to 49 workers receive a 46% share of the GGE value of all incentives; firms with 50 to 249 workers receive a 28% share of the GGE value of the incentives; 15% of the GGE value of the incentives are granted to the micro-firms with up to 9 workers; the remaining 11% of the GGE value of the incentives are granted to the large firms with 250 or more workers.

Also of interest is the distribution of the assisted firms by the number of different program interventions by which they were subsidized in the 2001-2003 period. Among all assisted firms, 38.3% were subsidized by two or more program interventions (22% by two interventions; 9.8% by three interventions; 6.5% by four or more interventions, with a maximum of eight different program interventions for two of the assisted firms). The remaining 61.7% of assisted firms were subsidized by a single program intervention.

Sorted by firm size, the percentage of treated firms that were granted assistance by a single program varies from 79% for micro-firms up to 9 employees to 40% for firms between

[8] With the exclusion of the portion of the program administered by the Italian Ministry of Education, University and Scientific Research which focused on supporting R&D projects and research centers.

[9] Not surprisingly, in Table 5 the programs with the highest volume of GGE subsidies are those providing capital grant assistance. This is because, as indicated in section 2.1, the GGE value for the repayable soft loans is computed based solely on the net present value of the differential between the hypothetical flow of the market-rate interest rate payments on the assisted loan and the actual flow of the interest rate payments at the discounted rate.

50 and 249 employees (with 60% of the firms between 50 and 249 employees that received assistance under two or more different programs in the 2001-2003 period, Table 6). The percentage of subsidized firms assisted by multiple programs is also very high within the 10-49 employees category, with 43.5% of such firms receiving assistance from two or more different programs.[10]

[Table 6]

3.2. Percentages of Assisted Firms on the Total Number of Active Firms

Table 7 shows the percentages of assisted firms on to the total number of active firms located in the Piemonte region. From 2001 to 2003, 11.1% of all active firms with industrial production activities (ISTAT Ateco2002 codes: C, D and E) were assisted under at least one business incentive program. Micro-firms with up to 9 employees, however, are composed by a large number of solo-entrepreneur firms (with no employees) engaging in professional services unsuitable for public assistance. Ignoring such micro-firms brings the number of assisted firms to much higher percentages. Among firms with 50-249 employees, 63.5% of all active firms were subsidized by at least one program during the 2001-2003 period, while such percentage is 42.7% and 37.5% for firms with 250 or more employees and firms with 10-49 employees, respectively.

[Table 7]

3.3 2000-2003 Employment Changes per Type of Assisted Firms

Tables 8-14 contain the descriptive statistics for the 2000-2003 employment changes sorted by the categories of assisted firms based on the economic intensity and type of the public assistance that they received and on their initial firm-size.[11]

Table 8 highlights the 2000-2003[12] average per-firm absolute variation in the number of employees separately for assisted and non-assisted firms. To limit the effects of possible measurement errors in employment change figures, 47 outlier firms were excluded from the analysis (of which 35 non-assisted firms and 12 assisted firms). Such excluded firms experienced either a positive or negative workforce variation beyond 0.5 per thousand percentile limit of the 2000-2003 employment change distribution.

[Table 8]

[10] The number of different program interventions are computed by counting as a single intervention all of the subsidies granted by a same program in a same year.

[11] It should be clear that such descriptive statistics do not represent in any way the actual impact estimates of the employment effects of the program. The employment changes highlighted in this section, indeed, could have be caused by many economic changes and factors totally independent by the programs interventions. To infer on the actual employment impacts due to the program incentives, such descriptive statistics have to be compared with a credible estimates of the counterfactual changes. Results from the next sections of this paper will highlight such counterfactual empirical evidence.

[12] For new firms, such variation is the difference between 2003 and the year in which the firms started operating.

The group of non-assisted firms in the 2000-2003 period experienced an average employment loss of 0.76 employees per firm. In the same period, the assisted firms experienced a positive average employment change of 0.48 employees per firm. The average employment change recorded by the assisted firms is further detailed in Table 9, which reports the average changes per categories of assisted firms based on the GGE value of the incentives received. Figures reported in Table 9 shows how the most positive average employment change was recorded in the firms that received incentives of the highest GGE value: Positive 15.9 employees per firm in the category of firms receiving incentives beyond the 99.5th percentile (with more than 909,742€ GGE worth of incentives); positive 4.7 employees per firm in the category of firms with GGE incentives between the 95th and the 99.5th percentile (GGE between 269.302€ and 909.742€); positive 1.7 employees per firm in the category of firms with GGE incentives between the 90th and the 95th percentile (GGE between 168.795€ and 269.302€); and positive 2.55 employees per firm for firms within the 9th decile (GGE between 89.351€ and 168.795€).

[Table 9]

Table 10 contains descriptive statistics for the 2000-2003 employment change experienced by categories of firms defined by both the GGE value and the type of the incentives that they received. The 236 firms assisted exclusively with soft loans, on average, experienced an employment increase of 1.61 employees per firm, while the increase recorded in firms assisted solely with capital grant was 0.13 employees per firm. The 1,049 firms assisted by both below-market-rate loans and capital grants, finally, experienced an increase of 1.57 employees per firm.

[Table 10]

Table 11 reports the 2000-2003 per-firm average employment change sorted by firm size categories. In each firm-size category, non-assisted firms consistently recorded negative employment changes: -0.12 employees for firms between 1 and 9 employees; -3.51 employees for firms from 10 to 49 employees; -23.36 employees for firms from 50 to 249 employees; -19.19 employees for firms with 250 or more employees. Their counterpart assisted firms recorded instead positive employment changes in the categories up to 49 employees and a negative change in the categories from 50 employees up (of a magnitude largely inferior to that of the non-assisted firms in the category between 50 and 249 employees; and of a magnitude slightly larger than that of non-assisted firms in the 250 and more employees category).

Within each firm-size category, the assisted firms that recorded the best employment outcomes were consistently the ones receiving incentives of the highest GGE value (i.e. firms within the IV quartile of the GGE distribution of assisted firms).

[Table 11]

Next, we turn to the methodological approach used to tease out the impacts of the program interventions by attempting to establish the counterfactual.

4. Methods

Ideally, counterfactual impact evaluations of enterprise support policies require comparing the pre-post intervention outcome variation experienced in the group of treated units with an adequate estimate of the outcome variation that would have been experienced in the same treated units in the absence of the program intervention.

To assess how much of the actual changes in the outcome variable of the analysis are attributable to economic trends and other factors completely independent from the programs interventions it is crucial to use data not only on firms that received assistance but to also on the non-assisted firms.

In general, comparing the outcomes of assisted and non-assisted firms follows an impact identification strategy referred to as "comparison group design." In "comparison group" designs, data on non-assisted firms are used as a base to estimate the magnitude of the outcome changes that would have affected the assisted firms also in the absence of the programs incentives. Using the non-assisted firms is a means to estimate the impact exerted on the outcome variable of the analysis by factors such as general or sectoral economic trends or socio-demographic, behavioral and institutional changes that are part of the overall economy in which both the assisted and non-assisted firms operate.

With comparison group design evaluations, if it were possible to analyze groups of assisted and non-assisted firms identical to each other, program impact estimates would be retrievable by simply comparing the average pre-post intervention changes in the outcome variable of interest between the assisted and non-assisted firms. Lacking a random assignment into the treatment, one of the fundamental challenges that the empirical analysis has to face is the fact that assisted and non-assisted firms may be different in many ways. When this is true, the different initial firm characteristics may interact differently with the general economic trends and/or socio-demographic, behavioral and institutional changes commonly experienced in the region where the assisted and non-assisted firms operate. Such different interactions could result in changes in the outcome variables that would occur differently between the assisted and non-assisted firms even in the absence of the program intervention, causing the program impact estimates to be biased (i.e. selection bias; see Bartik 2004, Bartik and Bingham 1997 and Bondonio 2000 for a general discussion of "comparison group designs" analyses).

To address such selection bias issues within the general "comparison group design" approach, the empirical analysis implemented in the paper is a three steps "conditional difference in difference" (CDD) model (e.g. Heckman et al. 1998, Ho, Imai, King and Stuart. 2007).

In the first step, a single indicator is created to summarize all relevant firm characteristics (measured at the pre-intervention time, year 2000) that may interact with the general economic trends and/or socio-demographic, behavioral and institutional changes to generate a change in the employment dynamic for the subsequent years 2001-2003

(independently from the programs interventions). Such indicator, referred to as "propensity score" (PS), is estimated from a probit regression model estimated for each category of programs intervention considered in the analysis and yielding the predicted probability of receiving that particular type of program assistance for each firm (e.g. Bondonio 2009; Heckman, et al. 1997**,** 1998; Rosembaum and Rubin 1983; Bondonio and Engberg 2000).

The second step establishes common support between assisted and non-assisted firms. For each category of treatment, the assisted firms with PS higher than the 99.5 percentile of the PS distribution of the firms not assisted under the same category of treatment are eliminated from the analysis. This procedure is aimed at eliminating, within each category of treatment, the assisted firms with initial characteristics too unique and non-comparable to those of the firms non-assisted under the same treatment category (Ho, Imai, King and Stuart. 2007, Bondonio and Engberg 2000) .

In the third step, the programs impacts for each category of treatment are estimated though a regression design characterized as a CDD model implemented on the sample of comparable firms selected from step two. In such CDD regression design, the outcome variable is differentiated between the post and pre-intervention time (2003-2000), ensuring that all of the unobserved differences that may exists between assisted and non-assisted firms (within each category of treatment) are controlled for if they are characterized as fixed effects (i.e. initial firms characteristics that affect future outcome variable levels in a constant manner over time). Through the inclusion of set of explicit covariates (expressing a number of observable firms characteristics such as industrial sector, size, location, and firm age) the model is also capable of controlling for the differential impact on the outcome variable between the assisted and non-assisted firms due to some remaining different initial observable characteristics, even if such characteristics are not characterizable as fixed effects and they may affect future outcome variable levels in a non constant manner over time.

The estimation of such a three steps empirical model is finally completed by an extensive sensitivity analysis aimed at testing the volatility of the program impact estimates to different functional forms with which the observable control variables may be included in the actual specifications of the CDD regression design described in step three.

The 2000-2003 firm-level employment changes used as the outcome variable of the model is expressed in terms of absolute changes rather than as percentage changes. This is because the economic rationale of the enterprise support programs considered in the analysis is based on producing socio-benefit outcomes at the level of the local economies surrounding the place in which the assisted firms operate. As a result, the social benefit of each additional job generated by the programs incentives (compared to what would have happened in the absence of the program) is to be weighted equally whether or not such additional job is generated in a small or large firm. While from the point of view of the assisted entrepreneurs, the significance of a given employment change has to be weighted based on the initial size of the assisted firm, this is not necessarily the case from the point of view of employment changes for a local community, and operationalizing employment changes as percentage changes would place an unjustified larger weight to the outcomes produced in the smaller assisted firms.

4.1. Model specifications

The model specifications are operationalized differently according to the types of categorical treatment variables included in the CDD regression design.

-Impact Estimates by the Economic Intensities of the Incentives

In order to estimate the differential impacts of the program incentives at different levels of the economic value of the incentives, two model specifications were adopted. The first specification contains four binary treatment variables based on the quartile thresholds of the distribution of the GGE values of the incentives received by the assisted firms. The second specification contains twelve binary treatment variables based on the decile thresholds of the distribution of the GGE values of the incentives, with the last decile (which contains assisted firms with outlier GGE value of the incentives) further divided into three categories: 90- 95 percentile thresholds; 95-99.5 percentile thresholds; and above the 99.5 percentile threshold. Impact estimates obtained from the first specification highlight the absolute (per-firm) employment variation attributable to the programs incentive, separately estimating the differential impacts of four different categories of the economic values of the incentives. Similarly, the second specification yields the programs employment effects separately estimating the differential impacts of twelve different categories of the economic values of the incentives.

In detail, the two model specifications are estimated through the following three steps:

I) Estimation of a set of *n* probit models (n=5 for the first specification; n=13 for the second specification) in which the dependent variables are the categorical treatment variables (4 and 12, respectively, in addition to 1 non-treated category n=0):

$$P[T^{n}=1] = f(DIM, PROV, SETT, CRAFT, SINGLE\_EST, NEW, VANISH); \quad (1)$$

Where:

n=[1^{st} *quartile,* 2^{nd} *quartile,* 3^{rd} *quartile,* 4^{th} *quartile, 0]* (for the first specification);

n=[1^{st} *decile;……;* 9^{th} *decile, 90-95 perc; 95-99.5 perc;* $\geq$*99.5 perc; 0]* (for the second specification);

$T^{(n=1\ qrt)}$ =1 if a firm received a GGE economic value of the incentives below the threshold of the first quartile of the distribution;
=0 if a firm either did not receive any incentive or received incentives of different GGE value;

[…]

$T^{(n=1\ dec)}$ =1 if a firm received a GGE economic value of the incentives below the threshold of the first decile of the distribution;
=0 if a firm either did not received any incentive or received incentives of different GGE value;

[…]

$T^{(0)}$ =1 if a firm did not receive any incentives during the 2001-2003 period;

=0 if a firm did receive any type of incentives;

DIM= set of four binary variables coding whether or not a firm belongs to one of the following size categories: micro-firm (0-9 employees); small firm (10-49 employees); medium firm (50-249 employees); large firm (250 or more employees);

PROV = set of eight binary variables coding the province location of the firm's headquarters;

SETT =set of sixteen binary variables coding the industrial sector of the firms (following the two-digit ISTAT Ateco2002 classification);

CRAFT = 1 for craft firms (for which public assistance may also be available through additional dedicated programs);
= 0 for non-craft firms;

SINGL_EST= 1 for single establishment firms;
= 0 for multiple establishment firms;

NEW = 1 for firms that began operating after 2000;
= 0 for firms already in existence during year 2000;

VANISH = 1 for firms that cease operations during the 2000-2003 period;
= 0 for firms continuing to operate during the 2000-2003 period.

II) The propensity scores obtained from each of the probit specifications estimated in step I) are separately ordered for the firms having $T^n=1$ and $T^n=0$ for each of the *n* treatment categories considered in the two model specifications. Separately for each of the *n* treatment category, the firms with $T^n=1$ (the treated firms for the n^{th} treatment category) having a PS higher than the 99.5 percentile of the PS distribution for the $T^n=0$ firms are eliminated from the analysis.

III) Programs impact estimates are retrieved through the following CDD regression design estimated from the sample of firms resulting from step II:

$$\Delta Y_i = \alpha + \sum_n \beta T^n_i + \sum_d \phi DIM\_d_i + \sum_p \varphi PROV\_p_i + \sum_s \sigma SETT\_s_i + \pi CRAFT_i + \theta SINGLE\_EST_i + \omega NEW_i + \gamma VANISH_i + \varepsilon \quad (2)$$

Where

ΔY_i = 2000-2003 absolute employment change;

$\sum_n \beta T^n_i$ = set of treatment status variables specified as follows: $n \in \{1^{st}$ quarter; 2^{nd} quarter; 3^{rd} quarter; 4^{th} quarter$\}$ for the first specification[13]; $n \in \{1^{st}$ decile; 2^{nd} decile; ……;8^{th} decile; 9^{th} decile, 90- 95 percentile; 95-99.5 percentile; >99.5 percentile$\}$ for the second specification[14];

[13] 1^{st} quartile (<9,661€ GGE); 2^{nd} quartile (9,661€-25,685€ GGE); 3^{rd} quartile (25,686€-69,857€ GGE); 4^{th} quartile (>69,857€ GGE).

[14] 1^{st} decile (<4,085€ GGE); 2^{nd} decile (4,086€-7,586€ GGE); 3^{rd} decile (7,587€-11,860€ GGE); 4^{th} decile (11,861-17,532€ GGE); 5^{th} decile (17,533€-25,685€ GGE); 6^{th} decile (25,686€-37,187€ GGE); 7^{th} decile (37,188-56,108€ GGE); 8^{th} decile (56,109€-89,350€ GGE); 9th decile (89,351€-168,795€ GGE); 90-95

Equation (2) expresses the 2000-2003 employment change as a function of the program incentives and a series of pre-intervention firm specific characteristics representing a source of potential outcome variation due to factors that are independent from the programs incentives.

By differencing the outcome variable, the model controls for firm-specific unobserved fixed effects that may affect employment differently between firms of different treatment categories and non-treated firms. Through the inclusion of the set of binary control variables (DIM, PROV, SETT, CRAFT, SINGLE_EST, NEW, VANISH) the model of equation (2) also controls for employment-change differences due to heterogeneity between treated and non-treated firms (and between firms of different treatment categories), when such heterogeneity is not characterized in terms of fixed effects.

-Impact estimates by the types of programs incentives

The differential impacts of the program interventions due to the different types of incentives awarded to the assisted firms are estimated through two additional specifications of the baseline CDD model previously described.

The first specification includes three categorical treatment variables in the model of equations (1) and (2) in order to separately estimate the employment impact of the incentives under the form of capital grants,[15] soft loans and a combination of both. The second specification, at the expense of some statistical efficiency, includes ten different categorical variables in the model of equations (1) and (2). Such ten treatment variables are aimed at estimating the different employment impact of the different types of incentives, simultaneously controlling for the economic value of the incentives (as expressed by the GGE). This is achieved by generating each categorical treatment variable from cross tabulating four different degrees of the economic value of the incentives with the distinction between capital grants, soft loans and capital grants plus soft loans.[16]

5. Results

Table 12 highlights the programs impact estimates for four different categories of treated firms based on the overall economic value (in terms of gross grant equivalent -GGE) of the incentives. The results show that the average employment impact of the programs is 1.87 additional jobs compared to what would have happened without the programs incentives in each assisted firm when the per-firm GGE value of the incentives is within the first quartile of distribution (less than 9,661€); 1.69 additional jobs per assisted firm when the GGE value of the incentives is between 9,662€ and 25,685 (second quartile of the distribution); 3.20

percentile (168,796€ -269,302€ GGE); 95-99.5 percentile (269,303€ - 909,742€); >99.5 percentile (>909,742€ GGE).

[15] The capital grants category also includes fiscal bonuses, non-refundable contributions to pay for interest rate expenses without the offering of any additional collateral guarantee to the underlying loan.

[16] Such cross tabulation is yielding ten treatment variables instead of twelve because none of the firms assisted by soft loans received subsidies with a combined GGE value above the threshold of the II° quartile (25,685€, Table 10).

additional jobs per assisted firm when the GGE value of the incentives is between 25,686€ and 69,857€ (third quartile of the distribution); 6.87 additional jobs per assisted firm when the GGE value of the incentives is greater than 69,857€ (fourth quartile of the distribution).

[Table 12]

Based on the impact estimated reported in Table 12, the overall employment impact produced by the incentives awarded to the entire set of the 5,284 assisted firms can be summarized as follows:

- The 6.5 million € spent for the incentives with a per-firm GGE value less than 9,661€ (first quartile threshold) accounted for a total increase of approximately 2,470 jobs compared to what would have happened in the absence of the incentives. The average cost for each job attributable to the incentives is equal to about 2,640€;
- The 21.75 million € spent for the incentives with a per-firm GGE value between 9,661€ and 25,685€ (second quartile) accounted for a total increase of approximately 2,235 jobs (compared to what would have happened in the absence of the incentives), with an average cost of each job attributable to the incentives equal to about 9,730€;
- The 57.3 million € spent for the incentives with a per-firm GGE value between 25,685€ and 69,857€ (third quartile) accounted for a total increase of approximately 4,330 jobs compared to what would have happened in the absence of the incentives, with an average cost for each job attributable to the incentives equal to about 13,550€;
- The 288.9 million € spent for the incentives with a per firm GGE value above 69,857€ accounted for a total increase of approximately 9,058 jobs compared to what would have happened in the absence of the incentives, with an average cost for each job attributable to the incentives equal to about 31,891€.

For the sake of brevity, detailed results from the second model specifications (including 12 different treatment categories based on different per firm GGE values) are not shown and are available from the authors. Findings from such model, however, are very much in agreement with the results summarized in table 12:

- The per-firm employment impacts of the incentives are confirmed to be the highest in the treatment categories with the greatest GGE value (except for a slight decrease of the employment impact going from the two lowest deciles to the deciles immediately above them; and with a sharp increase of the employment impact for the incentives in the highest percentile –GGE above 909,742 €);
- When weighting the employment impacts by the GGE value of the incentives, the average cost for each additional job is again greater the higher is the economic value (GGE) of the subsidy received by the assisted firms.[17]

[17] To correctly interpret these results, it is important, once again, to keep in mind that the economic value of the incentives (expressed in terms of GGE) does not coincide with the total value of the subsidized investment made by the assisted firms. As a result, the average cost per each additional job attributable to the incentives should not be interpreted as the volume of the additional investments required to generate an additional job. Moreover, the economic value (in terms of GGE) of all of the incentives awarded as soft loans is generally quite low. Receiving incentives with an economic value in the lowest percentiles is therefore strongly correlated with the receiving of

5.1 Impact Estimates by Types of Incentives

Table 13 summarizes the impact estimated sorted by the different types of incentives awarded to the subsidized firms. The coefficient estimates reported in Table 13 separately highlight the number of additional jobs (against a counterfactual estimate) generated on average by each treated firm belonging to three different categories: firms assisted solely by soft loans; firms assisted solely by capital grants; firms assisted by both soft loans and capital grants. When a treated firm receives capital grant assistance, the per-firm average employment gain compared to what would have happened in the absence of the incentives is estimated to be on average 2.83 additional jobs, all else equal. If a treated firm receives only soft loans, the per-firm average employment gain compared to what would have happened in the absence of the incentives is estimated to be 2.44 additional jobs. For treated firms granted with both capital grants and soft loans assistance, the estimated per-firm average employment gain compared to what would have happened in the absence of the incentives is estimated to average 4.16 additional jobs.[18]

[Table 13]

The results from the second model specification, which allows separate identification of the employment impacts for capital grants, soft loans and mixed types of assistance, controlling for four different intensities of the economic value of the incentives, can be summarized as follows:[19]

- When the incentives have a GGE value up to 9,661€, the threshold of the first quartile of the distribution, soft loans generate a per-firm employment average gain of 2.53 jobs compared to what would have happened in the absence of the incentives. This estimate corresponds to an average cost of each job attributable to the incentives equal to 852 €. Capital grants generate a per-firm employment gain of 1.52 jobs, with an average cost of each job attributable to the incentives equal to 3,580 €. Multiple aid under the form of both soft loans and capital grants generate a per-firm employment gains of 2.55 jobs, with an average cost of each job attributable to the incentives equal to 2,351 €.
- When the incentives have a GGE value between 9,661€ and 25,685€, second quartile of the distribution, capital grants generate a per-firm employment gain of 1.84 jobs,

soft loans instead of capital grants. Because of such correlation, the impact heterogeneity across the different categories of economic values of the incentives should be considered as affected not only by the different monetary values of the incentives but also by the different types of assistance (soft loans versus capital grants). Such employment impact heterogeneity across different types of assistance is specifically highlighted in the results summarized in Table 13.

[18] Such estimates are under the form of categorical average treatment impact, ignoring the possible heterogeneity among the different economic values of the incentives received by the firms assisted with capital grants, soft loans or both these forms of assistance. Results that also incorporate heterogeneity in the economic values of the incentives are presented later in this section.

[19] For the sake of brevity, tables with the complete results from this model specification are not included in the paper and are available upon request to the corresponding author: daniele.bondonio@sp.unipmn.it.

with an average cost of each additional job equal to 8,899€. Multiple aid under the form of both soft loans and capital grants generate a per-firm employment gain of 1.14 jobs, with an average cost of each additional job equal to 14.823€.[20]

- When the incentives have a GGE value between 25,685€ e 69,857 €, the third quartile of the distribution, capital grants assistance generates an average per-firm employment gain of 2.94 jobs, with an average cost of each additional job equal to 14,498 €. Multiple aid under the form of both soft loans and capital grants generate an average per-firm employment gain of 3.57 jobs, with an average cost of each additional job equal to 12,868€.
- When the incentives have a GGE value above 69,857 €, the fourth quartile of the distribution, capital grants generate a per-firm employment gain of 7.32 jobs, with an average cost of each additional job equal to 29,733€. Multiple aid under the form of both soft loans and capital grants generate a per-firm employment gain of 7.18 jobs, with an average cost of each additional job equal to 30,755€.[21]

Overall, the results highlight that the average employment impact of the programs without controlling for the differences in their economic value is of the same magnitude across the various types of incentives. Soft loans, however, do show a greater effectiveness than capital grants due to the fact that they achieve the same degree of efficacy as capital grants by offering to the assisted firms a "gift" in terms of public money devoted to the incentives of lesser monetary value than capital grants, resulting in lower average cost for each additional job attributable to the incentive programs.

5.2 Results of the Sensitivity Analysis

The robustness of the employment estimates is tested through an extensive sensitivity analysis composed of a series of additional model specifications.

The alternative specifications are obtained through different choices in selecting the functional forms by which the independent variables are inserted in the third step of the empirical model (equation 2). For the sake of brevity, it is not possible to describe the detailed results of all the different specifications included in the sensitivity analysis, but the complete results are available upon request. Overall, the empirical evidence yielded by the entire set of the different specifications included in the sensitivity analysis is in close agreement with the results presented.

[20] For such incentives with GGE values within the second, third and fourth quartile of the distribution, it is not possible to identify the employment impact of the soft loans. This is because in all the program activity data used in the analysis the GGE values of such incentives are always below the threshold of the first quartile (9,661€), with the only exception of three cases with a GGE value within the second quartile threshold 25,686€).

[21] As already mentioned before, it is important to emphasize that the differential impact estimates obtained for the different types of incentives are obtained controlling for the economic value of the subsidies operationalized as the cost to the public of the incentives (GGE) and not under the form of the total financing awarded to the assisted firms. In the case of soft loans incentives, it is worth reiterating that the GGE value is largely inferior to the total financing received to the assisted firms for their subsidized investments.

5.3 Caveats and Limitations

- The sample of firms assisted with soft loan incentives is quite small (236) and largely inferior to the sample of assisted firms that received capital grants (3,999) and to the sample of firms that received capital grants in conjunction with soft loans assistance (1,049). Such small sample size does limit, to a certain extent, the external validity of the results related to the differential impacts between different forms of assistance. Moreover, by computing the economic value (in terms of –GGE) of the soft loans assistance, it was not possible to take into account the share of the cost related to the possible defaulting of some of the subsidized firms.

- Pre-intervention employment changes recorded in both treated and non-treated firms would constitute a very useful observable control to include in the empirical conditional difference in difference (CDD) model used to yield the programs impact estimates. As commonly encountered in counterfactual impact evaluations of enterprise support policies, however, the pre-intervention employment trends recorded in both treated and non-treated firms cannot be included in the analysis as part of the set of observable control variables. This is due to the fact that the employment changes recorded in years prior to 2001 likely were affected by the previous rounds of the unobservable incentive payments related to number of incentive programs that were in existence before 2001.

6. Conclusions

This paper exploits a unique firm level database formed by merging reliable administrative data on firms' demographic and employment activity from the Italian National Statistical Institute, ISTAT, with the programs' activity archives on a complete set of co-existing European Regional Development Fund (ERDF) co-sponsored programs and other independent national and regional incentives available to all active firms with industrial production in a large north-western region of Italy.

Analyzing the entire spectrum of such co-existing programs (8 of which are national, 10 regional and 7 with ERDF co-sponsoring) enables, at first, to estimate how the entire set of public assistance available within a same NUT III region of the EU is divided between assisted firms of different characteristics and to estimate the percentage of all active firms receiving public assistance. This type of preliminary information is very important to policy makers and yet is very rarely available throughout the EU due to the lack of integration between the different single-program activity archives and reliable administrative data on the entire population of active firms. In this regard the main findings produced by the Italian data analyzed in this paper can be summarized as follows:

- The largest share (46%) of the economic value of the entire set of the programs incentives available is awarded to small enterprises (with 10 to 49 workers), while 28%

goes to middle enterprises (from 50 to 249 workers), 15% goes to micro- firms (less than 10 workers) and 11% goes to the largest enterprises (250 or more workers).

- Assisted firms rely quite often on multiple sources of incentives. For example, about 60% of all medium enterprises receiving public assistance in the 2001-2003 period were awarded with incentives from two or more programs. Among all size classes of assisted firms, approximately 38% received assistance from multiple programs.

- The overall percentage of active firms receiving public assistance is truly remarkable. During the 2001-2003 period alone, 63.5% of all active medium enterprises were subsidized with incentives from at least one public program, and 42.7% of large firms and 37.5% of small enterprises (excluding the micro-firms with fewer than ten workers) received subsidies.

Next, by developing a statistical counterfactual impact evaluation model, this paper exploits the extensive Italian firm level database to yield employment estimates on the comparative effectiveness of the different forms of incentives. Such employment impact estimates are retrieved by disentangling the impacts of different values of both the economic intensities of the program assistance and different forms of assistance, distinguishing between capital grants and below-market interest rate/revolving loans.

Results from the impact evaluation analysis highlight that the absolute per-firm employment effects of the programs are increasingly higher the higher their economic value (in terms of gross grant equivalent subsidy) of the incentives awarded to each assisted firms. When the per-firm employment increases are compared to the costs of the subsidies, the incentives with the highest per-firm economic value, however, yield employment impacts with a much higher cost per each additional new job generated compared to the estimated counterfactual status of incentives with a lower economic value.

Disentangling the program impacts of the different types of incentives, the results show that the absolute per-firm employment effects of soft loans assistance are similar to those of capital grants assistance, which include fiscal bonuses and interest rate payment grants with no collateral guarantees. However, taking into consideration that soft loans assistance bears a much lower cost in terms of public money devoted to the subsidies than capital grants assistance (with much lower gross grant equivalent subsidy levels), the impact estimates retrieved from analysis indicates that soft loans possess an higher employment effectiveness than capital grants. This finding is reflected in a higher per-firm employment return of soft loans assistance than capital grant assistance, holding constant the GGE value of the incentives awarded to each assisted firm. Thus, there is a lower cost of the soft loan assistance compared to the capital grant assistance for each additional new job generated by the programs.

Overall, such empirical evidence produced by the analysis points into the direction of considering emphasizing soft loans assistance rather than capital grants to support small and medium enterprises. This is possibly due to the fact that credit market imperfection might temper the efforts of obtaining full funding for many viable investments projects of small and

medium enterprises. This is also in spite of the fact that loan assistance leaves the firms more highly leveraged.

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Table 1: National Programs

Law reference	Program activity	Eligible sectors	Eligible beneficiaries	Type of incentives (2001-03 period)
228/97 art. 4	Aid for firms located in areas at risk of flooding	Multi-sectors (*)	SMEs	Interest rate grants(**)
226/99 art. 3	Loans Renegotiations (original assistance provided by Law 35/95 for firms affected by floods)	Multi-sectors(*)	SMEs & large firms & professionals	Interest rate grants(**)
662/96 art. 2, c. 3	Incentives for investments in "Territorial Pacts" (Patti Territoriali) areas	Multi-sectors(*)	SMEs & large firms	Capital Grants
95/95 (formerly 44/86)	Aids for promoting young entrepreneurship	Multi-sectors(*)	SMEs	Capital Grants, Grants for current expenditures, Soft Loans
236/93	Aids for offering job training courses to employees	Manufacturing	SMEs & large firms & consortiums of firms	Capital Grants
488/92 industry art. 1, c. 2	Incentives for investments in economically distressed regions	Industrial & Services Sectors	SMEs & large firms	Capital Grants
215/92	Aids to promote female entrepreneurship	Multi-sectors(*)	Small firms; Public & private entities devoted to promoting job trainings and technical assistance	Capital Grants
D.M. 593/00	Incentives to support R&D activities sponsored by the "Fund for Aids to Research Activities"	Multi-sectors(*)	SMEs & large firms	Capital Grants

(*) No specific sector limitations.

(**) With no direct collateral guarantees.

Table 2: Former National Programs Devolved to the Regional Government

Law Reference	Program Activity	Eligible Sectors	Eligible Beneficiaries	Type of Incentives (2001-03 period)
598/94 art.11	Incentives for innovation and environmental investments	Manufacturing, constructions & mining sectors	SMEs	Interest rate grants (**)
1329/65	Incentives for investments in machineries	Multi-sectors (*)	SMEs	Interest rate grants (**)
341/95 art. 1	Automatic incentives for investment in distressed areas	Industrial& service sectors	SMEs & large firms	Tax credit/fiscal bonus
140/97	Automatic incentives for innovation and R&D expenditures	Industrial sectors	SMEs large firms	Tax credit/fiscal bonus
266/97 art. 14	Aids to firms in distressed urban areas	Multi-sectors (*)	Small firms	Capital Grants
266/97 art. 8	Automatic incentives for investments	Industrial& service sectors	SMEs	Tax credit/fiscal bonus

(*) No specific sector limitations.

(**) With no direct collateral guarantees.

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Table 3: Regional Programs

Law reference	Program activity	Eligible sectors	Eligible beneficiaries	Type of incentives (2001-03 period)
Reg. Law 67/94	Incentives for investments aimed at boosting employment in cooperative firms	All sectors except construction and consumption cooperative firms	New Cooperative firms or existing cooperative firms with investments projects requiring increases in the workforce	Soft Loans & Capital Grants
Reg. Law 24/97 art. 6	Aids for developing clusters of firms in industrial districts	Multi-sectors (*)	Cooperative firms, consortiums and associations among SMEs,	Capital Grants
Reg. Law 28/93 (modified by Reg. Law. 22/97, Title II)	Aids for promoting start-up firms	Multi-sectors (*)	Solo-entrepreneur firms, corporation or partnership firms with a prevailing share of young partners, dislocated or female workers	Soft Loans and Capital Grants for start-up expenditures and technical and operating assistance
Reg. Law 56/86	Incentives for innovations & technological advancement in SMEs and for the adoption of quality systems in small firms	Multi-sectors (*)	SMEs or partnerships of SMEs.	Soft Loans

(*) No specific sector limitations.

Table 4: Obj.2 Area Programs Co-Funded by the ERDF

Law reference	Program activity	Eligible sectors	Eligible beneficiaries	Type of incentives (2001-03 period)
Measure 1.2a	Aids to support international market exposure	Multi-sectors (*)	SMEs	Capital Grants
Measure 2.1b	Soft Loans to support investment projects	Multi-sectors (*)	SMEs	Soft Loans
Measure 2.1d	Investments assistance in conjunction with EIB financing	Multi-sectors (*)	SMEs	Capital Grants
Measure 2.2b	Aids for financing corporate participations & acquisitions	Multi-sectors (*)	SMEs	Soft Loans for financing corporate participations &acquisitions
Measure 2.2c	Aids for consulting services	Multi-sectors (*)	SMEs	Capital Grants
Measure 2.4c	Support to develop e-commerce platforms	Multi-sectors (*)	SMEs	Capital Grants
Measure 4.1b	Soft loans to support investment projects	Multi-sectors (*)	SMEs	Soft Loans

(*) No specific sector limitations.

Table 5: Summary of Programs Incentives*

Law reference	Program activity	N. Assisted projects	Total GGE value of the incentives (1=1€)	Average GGE value of the incentives per assisted project (1=1€)
l. 488/92	Incentives for investments in economically distressed regions	232	65.392.306	281.863
l. 266/97 art. 14	Aids to firms in distressed urban areas	1.619	49.138.938	30.351
l. 140/97	Automatic incentives for innovation and R&D expenditures	1.475	48.807.976	33.090
l. 341/95	Automatic incentives for investments in distressed areas	1.414	46.358.249	32.785
l. 598/94 (cap. grants + soft loans)	Incentives for innovation and environmental investments	740	40.267.195	54.415
l. 662/96 art. 2, c. 3	Incentives for investments in "Territorial Pacts" (Patti Territoriali) areas	132	31.612.298	239.487
l. 1329/65	Incentives for investments in machineries	914	27.548.395	30.140
l. 226/99	Loans Renegotiations (Law 35/95 for firms affected by floods)	90	18.984.789	210.942
Docup 1.2a Ob2 (+ 1.2a PhO)	Aids for International market exposure	634	18.745.511	29.567
l. 228/97	Aids for firms located in areas at risk of flooding	39	15.084.231	386.775
Docup 2.1d Ob2 (+ 2.1d PhO)	Investments assistance in conjunction with EIB financing	51	11.049.801	216.663
l.r. 24/97	Aids for developing clusters of firms in industrial districts	174	6.868.848	39.476
Docup 2.2c Ob2 (+ 2.2c PhO)	Aids for consulting services	490	5.355.000	10.929
D.M. 593/00	Incentives to support R&D activities	47	2.971.905	63.232
Docup 2.4c (+Ob 2.4c PhO)	Assistance to support e-commerce selling services	148	2.608.449	17.625
l. 215/92	Aids to promote female entrepreneurship	37	2.233.670	60.369
l.r. 22/97 (cap. grants + soft loans)	Aids for promoting start-up firms	76	975.965	12.842
Docup 2.1b Ob2 (+2.1b PhO)	Soft Loans to support investment projects	231	685.502	2.968
l.r. 56/86	Incentives for innovations & technological advancement in SMEs and for the adoption of	215	496.314	2.308
l. 95/95 (cap. grants + soft loans)	Aids for promoting young entrepreneurship	1	344.865	344.865
Docup 2.2b Ob2 (+ 2.2b PhO)	Aids for financing corporate participations &acquisitions	32	158.998	4.969
l. 236/93	Aids for offering job training courses to employees	8	120.514	15.064
l.r. 67/94 (cap. grants + soft loans)	Incentives for investments aimed at boosting employment in cooperative firms	3	27.120	9.040
Docup 4.1b Ob2 (+ 4.1b PhO)	Soft loans to support investment projects	6	23.103	3.851
Total(**)		8.808	395.859.942	44.943

(*) Summary statistics are for incentives approved between 01.01.2001-31.12.2003 and awarded to firms with establishments in the Piemonte region and with a firm identifier (VAT code) traceable in the ISTAT-ASIA database. All figures are in terms of Gross grant Equivalent (GGE) values.

(**) As a number of assisted firms are subsidized by more than one program in the 2001-2003 period , the actual total

Note: (#.###) Dots are used as 1.000 separators.

Table 6: Distribution of Subsidized Firms by Number of Programs from Which They Received Assistance

	N. of programs from which assistance was received*			
	1	2-3	4 or more	Total
Size of assisted firms				
1 -9 employees	79,1%	19,2%	1,7%	100%
10 -49 employees	56,5%	36,9%	6,6%	100%
50-249 employees	39,9%	41,2%	18,9%	100%
250+ employees	75,0%	23,7%	1,3%	100%

* Multiple investment projects made by a same assisted firm under the provision of a same program are counted one time. Incentives are those approved between 01.01.2001-31.12.2003 and awarded to firms with establishments in the Piemonte Region and with a firm identifier (VAT code) traceable in the ISTAT-ASIA database.

Note: (##,#) Commas are used as decimal dividers.

Source: Istat-Asia data, Italian Ministry of Production Activities, Mediocredito central, Regione Piemonte, Finpiemonte, Sviluppo Italia Piemonte.

Table 7: Share of Active Firms that Received Public Assistance

	Non-Assisted firms	Assisted firms	Total
TOTAL	88,9%	11,1%	100%
Size of Assisted firms			
1 - 9 employees	95,7%	4,3%	100%
10 - 49 employees	62,5%	37,5%	100%
50 - 249 employees	36,5%	63,5%	100%
250 + employees	57,3%	42,7%	100%

Source: Istat-Asia data, Italian Ministry of Production Activities, Mediocredito central, Regione Piemonte, Finpiemonte, Sviluppo Italia Piemonte.

Note: (##,#) Commas are used as decimal dividers.

Table 8: Employment Change in Assisted- & Non-Assisted-Firms (Descriptive Statistics)

	N. of firms*	2000-2003 Avrg. per-firm empl. change**	Stand. Dev.
Non-assisted	42.310	-0,76	7,91
Assisted	5.284	0,48	16,03

* Sample of firms without 0.5 ‰ outliers (0.5 ‰ outliers =firms with a 2000-2003 employment change with an absolute value within the 0.5 ‰ percentile of the two tails of the distribution).
** Absolute per-firm changes (1=1 job).

Note: (#.###) Dots are used as 1.000 separators.
Note: (##,#) Commas are used as decimal dividers.

Source: Istat-Asia data, Italian Ministry of Production Activities, Mediocredito central, Regione Piemonte, Finpiemonte, Sviluppo Italia Piemonte.

Table 9: Employment Change in Assisted Firms Sorted by EGG Values of the Incentives (Descriptive statistics)

		N. of firms*	2000-2003 Average per-firm empl. change**	Stand. Dev.
Quartiles	**GGE val. of the incentives in €**			
1°	**1 - 9.661**	1.321	0,51	8,09
2°	**9.662 - 25.685**	1.321	-0,78	14,69
3°	**25.686 - 69.857**	1.321	-0,28	15,70
4°	**> 69.857 (max: 8.227.439)**	1.321	2,48	22,24
		5.284		
Deciles	**GGE val. of the incentives in €**			
1°	**1 - 4.085**	529	0,60	7,47
2°	**4.086 - 7.586**	528	0,62	9,71
3°	**7.587 - 11.860**	529	-0,45	10,66
4°	**11.861 - 17.532**	528	-0,89	15,35
5°	**17.533 - 25.685**	528	-0,57	14,31
6°	**25.686 - 37.187**	529	-0,76	15,11
7°	**37.188 - 56.108**	528	0,22	16,21
8°	**56.109 - 89.350**	529	-0,24	16,77
9°	**89.351 - 168.795**	528	2,55	19,39
10°	**> 168.795 (max: 8.227.439)**	528	3,76	26,49
		5.284		
Highest percentiles	**GGE val. of the incentives in €**			
90°-95°	**168.795 - 269.302**	264	1,69	20,69
95° - 99,5°	**269.303 - 909.742**	238	4,73	31,30
>99.5°	**>909.742**	26	15,87	28,14

* Sample of firms without 0,5 ‰ outliers (0,5 ‰ outliers =firms with a 2000-2003 employment change with an absolute value within the 0,5 ‰ percentile of the two tails of the distribution).

** Absolute per-firm changes (1=1 job).

Note: (#.###) Dots are used as 1.000 separators.

Note: (##,#) Commas are used as decimal dividers.

Source: Istat-Asia data, Italian Ministry of Production Activities, Mediocredito central, Regione Piemonte, Finpiemonte, Sviluppo Italia Piemonte.

Table 10: Employment Changes in Assisted Firms Sorted by Type of Subsidy & EGG Values of the Incentives. (Descriptive statistics)

		N. of firms*	2000-2003 . Average per-firm empl. change**	Stand. Dev.
Assisted firms				
Firms assisted with capital grants		3.999	0,13	16,63
Firms assisted with soft-loans		236	1,61	8,78
Firms assisted with both capital grants and soft-loans		1.049	1,57	14,85
Firms assisted with capital grants	**GGE value of the incentives**			
1° Quartile	(up to 9.661 €)	969	0,05	6,00
2° Quartile	(9.662€ - 25.685€)	1.096	-0,83	15,45
3° Quartile	(25.686€ - 69.857€)	1.031	-0,40	16,83
4° Quartile	69.858€ or more . (Max 8.227.439€)	903	1,98	23,86
Firms assisted with soft-loans	**GGE value of the incentives**			
1° Quartile	(up to 9.661 €)	233	1,62	8,83
2° Quartile	(9.662€ - 25.685€)	3	0,61	0,60
3° Quartile	(25.686€ - 69.857€)	0	-	-
4° Quartile	69.858€ or more . (Max 8.227.439€)	0	-	-
Firms assisted with both capital grants and soft-loans	**GGE value of the incentives**			
1° Quartile	(up to 9.661 €)	119	2,03	16,60
2° Quartile	(9.662€ - 25.685€)	222	-0,58	10,26
3° Quartile	(25.686€ - 69.857€)	290	0,16	10,74
4° Quartile	69.858€ or more . (Max 8.227.439€)	418	3,56	18,24

* Sample of firms without 0,5 ‰ outliers (0,5 ‰:outliers =firms with a 2000-2003 employment change with an absolute value within the 0,5 ‰ percentile of the two tails of the distribution).

** Absolute per-firm changes (1=1 job).

Note: (#.###) Dots are used as 1.000 separators.

Note: (##,#) Commas are used as decimal dividers.

Source: Istat-Asia data, Italian Ministry of Production Activities, Mediocredito central, Regione Piemonte, Finpiemonte, Sviluppo Italia Piemonte.

Table 11: Employment Changes by Firm Size & GGE Values of the Incentives

	N. of firms*	2000-2003 Avg. per-firm empl. change**	Dev. stand.
1-9 workers			
Non -assisted	37126	-0,12	2,71
Assisted:	1684	2,79	9,51
I quartile: (up to 9.661 €)	679	1,65	7,53
II quartile: (9.662€ - 25.685€)	496	1,94	5,91
III quartile: (25.686€ - 69.857€)	313	3,00	10,37
IV quartile: (69.858 or more €)	196	7,49	17,13
10 – 49 workers			
Non -assisted	4694	-3,51	9,04
Assisted:	2811	0,32	8,60
I quartile: (up to 9.661 €)	600	-0,68	6,19
II quartile: (9.662€ a 25.685€)	699	-0,56	9,02
III quartile: (25.686€ a 69.857€)	815	0,17	7,88
IV quartile: (69.858or more €)	697	2,27	10,26
50 - 249 workers			
Non - assisted	409	-23,36	49,61
Assisted:	724	-2,22	27,49
I quartile: (up to 9.661 €)	42	-0,88	23,70
II quartile: (9.662€ - 25.685€)	118	-12,01	30,94
III quartile: (25.686€ - 69.857€)	177	-5,38	23,86
IV quartile: (69.858€ or more)	387	2,05	27,44
250+ workers			
Non - assisted	79	-19,19	94,57
Assisted	65	-22,51	79,28
I quartile: (up to 9.661 €)	0	-	-
II quartile: (9.662€ - 25.685€)	8	-23,87	103,93
III quartile: (25.686€ - 69.857€)	16	-44,05	81,85
IV quartile: (69.858€ or more)	41	-13,83	73,42

* Sample of firms without 0,5 ‰ outliers (0,5 ‰ outliers =firms with a 2000-2003 employment change with an absolute value within the 0,5 ‰ percentile of the two tails of the distribution).

** Absolute per-firm changes (1=1 job).

Note: (#.###) Dots are used as 1.000 separators.

Note: (##,#) Commas are used as decimal dividers.

Source: Istat-Asia data, Italian Ministry of Production Activities, Mediocredito central, Regione Piemonte, Finpiemonte, Sviluppo Italia Piemonte.

Table 12: Programs Impacts by Quartiles of the EGG Values of the Incentives

Dep. var.: 2000-2003 per-firm absolute empl. change (1=1 job)

Independent variables	Estimated coefficient	Standard Deviation	P-Value
T_qrt_1 (=1 if incentives have GGE val. up to 9.661 €)	**1,87**	**0,254**	**0,000**
T_qrt_2 (=1 if incentives have GGE val. 9.662 € - 25.685€)	**1,69**	**0,259**	**0,000**
T_qrt_3 (=1 if incentives have GGE val. 25.686€- 69.857€)	**3,20**	**0,265**	**0,000**
T_qrt_4 (=1 if incentives have GGE val 69.858€ or more -Max 8.227.439€)	**6,86**	**0,286**	**0,000**
10-49 workers	-3,52	0,130	0,000
50-249 workers	-15,75	0,322	0,000
250+ workers	-24,93	0,761	0,000
Vercelli	0,35	0,223	0,120
Novara	0,29	0,156	0,059
Cuneo	0,44	0,132	0,001
Asti	0,37	0,208	0,073
Alessandria	0,40	0,148	0,007
Biella	-0,20	0,197	0,301
Verbania	0,23	0,219	0,284
CB Non energetic mineral extraction	0,30	0,762	0,695
DA- Food industries, drinks, tobacco	0,42	0,589	0,479
DB- Textile industries	-0,01	0,594	0,991
DC- Hide and leather industries	0,28	0,793	0,726
DD- wood industries	0,17	0,597	0,771
DE- Paper , printing and publishing	0,14	0,601	0,814
DF-Coke manufacturing and refineries	-0,54	2,210	0,805
DG-Chemical product manufacturing	0,72	0,710	0,309
DH-Rubber and plastic	0,91	0,630	0,149
DI- Processing of non-metallic minerals	0,64	0,621	0,303
DJ-Metal and metallic products	0,33	0,583	0,576
DK- Manufacturing and repair of machineries.	0,51	0,589	0,384
DL- Manufacturing of electrical machinery	0,13	0,589	0,831
DM- Vehicle manufacturing	-0,08	0,666	0,899
DN- Other manufacturing industries	0,17	0,595	0,777
Craft enterprise	-1,39	0,115	0,000
Single unit	-0,48	0,161	0,003
New firm (=1 if started after 31.12.2000)	0,41	0,123	0,001
Dead firm (=1 if ceased before 31.12.2003)	-11,42	0,215	0,000
constant	1,67	0,588	0,005
Number of observations	42038		
Adjusted R2	0,146		
F	217,820		
Prob>F	0,000		

Table 13 – Programs Impacts by Types of Subsidies

Dip. var.: 2000-2003 per-firm absolute empl. change (1=1 job)

Independent variables	Estimated coefficient	Standard Deviation	P-value
T_cap_grants	**2,83**	**0,165**	**0,000**
T_soft_loans	**2,44**	**0,579**	**0,000**
T_mix- (capital grants & soft loans)	**4,16**	**0,297**	**0,000**
10-49 workers	-3,41	0,129	0,000
50-249 workers	-15,29	0,325	0,000
250+ workers	-26,64	0,783	0,000
Vercelli	0,27	0,222	0,230
Novara	0,21	0,155	0,180
Cuneo	0,39	0,131	0,003
Asti	0,29	0,206	0,157
Alessandria	0,41	0,147	0,005
Biella	-0,33	0,197	0,094
Verbania	0,10	0,218	0,645
CB Non energetic mineral extraction	0,33	0,762	0,665
DA- Food industries, drinks, tobacco	0,37	0,586	0,523
DB- Textile industries	-0,12	0,591	0,841
DC- Hide and leather industries	0,22	0,788	0,780
DD- wood industries	0,15	0,594	0,804
DE- Paper , printing and publishing	0,19	0,598	0,745
DF-Coke manufacturing and refineries	-0,02	2,198	0,992
DG-Chemical product manufacturing	0,88	0,706	0,215
DH-Rubber and plastic	0,95	0,625	0,129
DI- Processing of non-metallic minerals	0,44	0,617	0,477
DJ-Metal and metallic products	0,23	0,580	0,691
DK- Manufacturing and repair of machineries.	0,52	0,586	0,376
DL- Manufacturing of electrical machinery	0,11	0,586	0,845
DM- Vehicle manufacturing	0,40	0,660	0,544
DN- Other manufacturing industries	0,13	0,592	0,828
Craft enterprise	-1,44	0,114	0,000
Single unit	-0,48	0,161	0,003
New firm (=1 if started after 31.12.2000)	0,37	0,122	0,003
Dead firm (=1 if ceased before 31.12.2003)	-11,54	0,214	0,000
constant	1,79	0,585	0,002
N. of Observations	42050		
Adjusted R2	0,144		
F	221,630		
Prob>F	0,000		